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ABSTRACT

This study examined teacher mobility between 1969-70 and 1971-72 in 36 elementary schools within one school district. Its purpose was to determine the influence of school characteristics on mobility, taking into account the influence of teaching-staff composition. This report describes the (a) relations between school characteristics and the characteristics of teachers assigned to schools--a resource allocation problem, (b) relationships between teacher characteristics and mobility, and (c) direct relationships between school characteristics and teacher mobility. The schools studied ranged in size from 100 to 1,200 pupils. On the average, 30 percent of the pupils had Spanish surnames. Four school characteristics were examined in relation to transfer, separation, and leave of absence of teachers: school size, racial-ethnic distribution of (a) pupils and (b) teachers, and pupil socioeconomic status. The effects of teacher characteristics on teacher mobility are summarized from an earlier study. The major findings were (a) leave of absence and separation were determined solely by teachers' personal characteristics, not by school characteristics; (b) transfer was directly influenced by the socioeconomic status (SES) of the schools' student body, because SES affected the attractiveness of a school to teachers (the rate of transfer was higher in low-income schools); and (c) schools' SES also influenced the composition of teaching staffs, which in turn affected the rate of transfer. (Author/PB)

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PERSONAL AND INSTITUTIONAL CHARACTERISTICS AFFECTING TEACHER MOBILITY: SCHOOLS DO MAKE A DIFFERENCE

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Stanford, California

May 1975

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Introductory Statement

The Center's mission is to improve teaching in American schools. Its work is carried out through five programs:

- Teaching Effectiveness
- The Environment for Teaching
- Teaching Students from Low-Income Areas
- Teaching and Linguistic Pluralism
- Exploratory and Related Studies

This report on the effects of school characteristics on the mobility of teachers is an outgrowth of research conducted in the program on Teaching Students from Low-Income Areas.

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PERSONAL AND INSTITUTIONAL CHARACTERISTICS AFFECTING TEACHER MOBILITY: SCHOOLS DO MAKE A DIFFERENCE

Annegret Harnischfeger

1. School Characteristics vs. Teacher Characteristics

Schools differ substantially in the average mobility of their teachers (see Harnischfeger, 1973a). The common perception of the problem of teacher mobility is that some schools have extremely unstable teaching staffs while others do not. Schools with high teacher mobility rates seem to differ systematically in other ways from schools for which mobility is low. One common finding is that schools which serve low-income or ethnic minorities tend to be those to which many teachers resist going and from which many teachers soon depart.

As great instability in a teaching staff is disruptive of the educational process, increasing concern for equality of education forces us to attend to the causes of teacher mobility. The simplest question is: How do schools differ in teacher mobility? The more relevant question is: Why?

Do teachers really leave low-income schools at a higher rate? If so, what are the causes?

The reality of differential mobility among schools allows us to ask a refined question. Teachers may leave a particular school either for personal reasons that would cause them to leave any school (e.g., pregnancy, military service) or because the school has characteristics which are generally unattractive to teachers. Earlier research clearly demonstrates that teachers differ in their probabilities of leaving a teaching setting. In particular, the recurring finding is that young, inexperienced, female teachers are much more dropout prone than others.

In an earlier report, we treated the problem of disentangling distinct teacher characteristics causal of mobility (Harnischfeger, 1973c). For example, differentiation of commonly confused teacher characteristics such as age, teaching experience, and length of service showed that a teacher's age is systematically and strongly related to all aspects of

teacher mobility, whereas years of teaching experience, once we account for age and length of service, has no influence on the stability of a teacher's school affiliation.

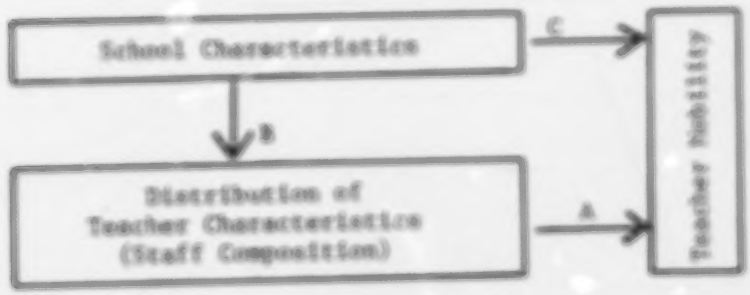
For the purpose of this report, the important conclusion to be drawn from previous research is that different types of teachers leave schools and leave teaching at different rates, independent of the characteristics of the school at which they teach. If we did not consider this result, the basic finding of school-to-school variation in mobility would tempt us to attribute this variation directly to differences in the characteristics of schools. The difference in the number of teacher dropouts between low-income and middle-class schools would then be attributed to differences in the socioeconomic status of the schools' students. We should, however, expect variations in teacher mobility that are related to the composition of teaching staffs. It is commonly asserted that schools serving people of low socioeconomic status have more young and inexperienced teachers than middle-class schools. If this is true, it might help to account for the higher mobility rates in low-income schools. Since different kinds of teachers leave with different frequencies, it is problematic whether differences among schools in relation to their success in retaining teachers can be directly attributed to differences in general school characteristics or to differences in the composition of their teaching staff.

If differences in teacher mobility are more directly due to differences in the socioeconomic composition of the student body served, then policy actions taken to increase the stability of the teaching staff must either change the composition (e.g., via busing) or change the atmosphere of the school directly. If variations in mobility are directly due to differences in the mobility propensities of certain types of teachers, then policy actions might well change the school assignment and transfer regulations of the district. An analysis of mobility variations among schools must show the extent to which these differences flow from the kinds of teachers assigned to the schools and from direct influences of the characteristics of the schools on the mobility process.

Figure 1 depicts two distinct processes influencing teacher mobility. (For the general mobility model on which it is based, see Harnischfeger, 1973a.) There are three components in the model: school characteristics, teaching staff composition (distribution of teacher characteristics), and teacher mobility. The arrow labeled A links the types of teachers assigned to a particular school with the extent of teacher mobility in that school. This linkage symbolizes the relation between a school's teaching staff characteristics and its staff's mobility. An earlier report (Harnischfeger, 1973c) articulated link A for individual teachers.

Figure 1

Model for the Impact of School and Teacher Characteristics of Teacher Mobility (School Level)



in this report, results from that study will be used to characterize the school linkage by estimating a staff composition mobility-propensity for each school. This will be accomplished by averaging the expected mobility rates for the particular teachers in each school (see Section V).

The major purpose of this report is to distinguish the effects on mobility caused through link C, which symbolizes the direct impact of school characteristics on teacher mobility, from the effects via link A. This task is impeded by link B, which represents the allocation of different types of teachers to schools with different characteristics. For example, schools with large numbers of pupils from ethnic minority groups may receive more teachers from minority groups than schools with predominantly white, middle-class pupils. If differences in staff composition systematically result in differences in teacher mobility, and if

the compositional differences are not taken into account, mobility rates that are strongly related to the composition of the staffs may masquerade as direct effects of school characteristics.

This report attempts to describe (1) the relations between school characteristics and the kinds of teachers assigned to schools--a resource allocation problem (link B, Fig. 1)--and (2) the direct relations between school characteristics and teacher mobility (link C).

2. School Characteristics: Their Variations and Interrelations

This report is based on a study of 36 elementary schools and their teachers in a California school district. (The district's schools, students, and teachers for school years 1968/69 through 1971/72 were described and compared to those in California and the United States generally in Harnischfeger, 1973b.) It is focused on teacher mobility between 1969/70 and 1971/72.

If school and teacher characteristics do have differential effects on teacher mobility, then our first task is to identify potentially causal characteristics of both kinds. This was accomplished for teacher characteristics in a previous report (Harnischfeger, 1973c), which was based on these teacher characteristics: age, sex, length of service in the district, years of teaching experience, academic degree held, and level of professional education. Another teacher characteristic that appears to be of great relevance to mobility is the ethnic or racial group to which a teacher belongs; however, since information about this characteristic was available only by school, it is treated as a school characteristic in the data analysis.

Three other readily available school characteristics were chosen for analysis. The most important of these were the racial-ethnic and socioeconomic backgrounds of a school's pupil population. The pupils' racial-ethnic distributions were available by school. The assessment of the socioeconomic level of the school, however, could be made only indirectly, through information on the extensiveness of the schools' free lunch programs. A further selected characteristic thought to be related to teacher mobility was size of school.

The district had 36 elementary schools. Most of the analyses reported below are based on 33 and 31 schools, because of missing or unreliable data.

School Size

Size was defined as the number of pupils officially enrolled in each school during the fall of the school year. Size might be expected to have an influence on teacher mobility because it is easier for a teacher to find a satisfactory position in a large school, where there is a greater variety of positions, than in a small one (see Harnischfeger, 1973a). Pupil enrollments ranged from just over 100 to 1200 pupils, but only four schools had discrepantly high enrollments of more than a thousand pupils (Table 1). The median enrollment was 533.

Table 1. Student Enrollment by School (N = 36), 1969/70

1	25*, 83
2	11*, 31, 69, 82
3	48*, 67, 69, 93, 96
4	32, 38, 48, 73, 81, 92
5	23, 43, 64, 92
6	02, 41, 55, 82
7	10, 20, 51, 77
8	18, 53, 56
9	
10	09*
11	16, 91*, 99

*These schools were eliminated from the 1969/70 regression analyses.

Note: The stem and leaf diagram (Tukey, 1970) is a method of displaying data that gives information about their distributional form as well as their actual values. In Tables 1-6 and 10-13, values are displayed so that they may be read by combining the integers to the left of the vertical line with those to the right to form a complete integer. For example, either 73 | 3, 5 or 7 | 33, 35 stands for 733 and 735. Only Table 1, since it consists of school enrollments, contains actual values. In the other tables, since the values are percentages (e.g., 73.3% or 4.1%) they were multiplied by 10 to obtain integers (yielding 733 or 41) before representation in the tables (as 73 | 3 or 4 | 1).

Pupil and Teacher Racial-Ethnic Distribution

The schools in the district varied widely in racial-ethnic distribution. However, the only sizable minority was of Spanish origin. Consequently, the percentage of pupils of this minority has been used to characterize each school's ethnic distribution (Table 2). The average percentage of such pupils was 30 percent, but in 44 percent of the elementary schools these pupils were highly underrepresented, making up less than 10 percent of the student body, while in 36 percent of the schools these minority-group pupils constituted the majority.

Table 2. Percentage of Spanish Surname Students by School (N=36), 1969/70

0	06, 16*, 23, 23, 48, 58*, 63*, 63, 71, 73, 76, 77, 81, 96, 98
1	49, 53, 66, 80
2	52
3	77
4	04
5	11, 30*, 36, 79, 89, 87
6	62, 75
7	33, 35
8	64, 64
9	43*

*These schools were eliminated from the 1969/70 regression analyses.

Note: In this table and hereafter, the values are percentages multiplied by 10, e.g., 943 represents 94.3 percent.

Only three percent of the teachers had Spanish surnames, and 10 percent belonged to some minority group (Spanish surname, Negro, Oriental and Other nonwhite). Thus, the teaching staffs of the schools were much more homogeneous in ethnic background than their student bodies. Seventeen percent of the elementary schools had no minority teachers, and even the largest minority teaching staff in a school constituted less than 30 percent of that school's total staff (Table 3). Because of this underrepresentation of Spanish surname teachers in the schools, the teachers' ethnic distribution has been characterized by the percentage of the nonminority group (White).

Table 3. Percentage of Nonminority Teachers by School (N=36), 1969/70

7	33, 43
7	83
8	00, 15, 24, 33
8	57*, 61*, 67, 75, 75*, 82, 89, 93
9	05, 09, 09, 13, 23, 26, 29, 37, 44
9	52, 55, 62, 67, 76, 76*
10	00, 00, 00, 00, 00, 00*

*These schools were eliminated from the 1969/70 regression analyses.

Although the racial-ethnic distribution of teachers was available only for school, the distribution is interpreted as characterizing individual teachers in the same fashion as the teacher characteristics discussed in Harnischfeger (1973c). Inclusion in a school-level analysis is only a substitute for a more refined analysis at the individual teacher level. Consequently, we interpret the percent nonminority teachers in a school as a teacher variable.

The pupils' racial-ethnic distribution is interpreted as an indicator of the socioeconomic level of a school's student body as well as the actual racial-ethnic distribution. The school's socioeconomic level is a characteristic of the teaching environment and may directly affect teacher mobility. Consequently, we treat the percent Spanish surname pupils as a school characteristic.

Socioeconomic Status of Student Body

The primary indicator of the socioeconomic level of the student body and community was constructed from data on a free lunch program operated for pupils from low-income families. The ratio of the number of free lunches to the total number of lunches served in the school year was used as the index of a school's socioeconomic level. In most schools (64 percent) in 1969/70, the free lunch program accounted for less than 7 percent of the lunches served (Table 4). This variable was expected to be related to the percentage of pupils with Spanish surnames because that minority constituted the major low-income population in the district.

Table 4. Percentage of Free Lunches by School (N=36), 1969/70

0	3, 8, 9, 9
1	0, 1, 3, 6, 8
2	0, 0, 3, 3, 4, 6, 7
3	4, 5, 5
4	1
5	7, 8
6	0
7	
8	8
9	
10	0, 2, 5
11	2
12	
13	
14	1
15	5
16	
17	
18	
19	
20	7

Allocation of Teacher Resources

A complaint often raised by teachers, principals, and parents is the unequal allocation of resources to schools, even within districts. The most important resource allocated to schools is teachers, and some of their characteristics are usually considered to be directly related to teaching quality. Salary schedules, of which the major determinants are years of teaching experience and professional attainment, reflect that belief. If we consider teaching experience and degrees held as major resource allocation factors, then it is important to investigate (1) whether schools differ in their weighting of these factors and (2) whether these factors are systematically related to school characteristics, especially the socioeconomic level of the student body.

In the sample studied, five schools did not have any inexperienced teachers, while in four schools more than 30 percent of the teaching staff had less than two years of teaching experience (Table 5).

Table 5. Percentage of Teachers with Less Than Two Years of Teaching Experience (N=35), 1969/70.

0	00, 00, 00, 00, 00
0	55, 63, 63, 91, 95
1	20, 25, 25*, 30, 30, 33, 43, 47
1	54, 58, 82, 82*
2	08, 22*, 26, 38
2	50, 69, 69, 78, 82*
3	08, 18, 33
3	64

*These schools were eliminated from the 1969/70 regression analyses.

A similar picture emerges for teachers with Master's degrees. Three schools had no teachers with Master's degrees, while five schools had teaching staffs in which over 30 percent held advanced degrees (Table 6).

Table 6. Percentage of Teachers with a Master's Degree (N=35), 1969/70

0	00, 00, 00*, 31*
0	59, 59, 77, 87, 95, 97
1	00*, 05, 25, 25, 28, 28*, 30, 36, 43, 43
1	67, 67, 67, 67, 82, 92
2	00, 00, 31, 31
2	
3	08
3	64, 75, 75
4	29

*These schools were eliminated from the 1969/70 regression analyses.

No systematic relations between the allocation of teachers and percentage of Spanish surname pupils--one index of the socioeconomic

class of the student body--were found (see Figures 2 and 3). Although schools do differ in the resources allocated to them, the data do not confirm the suspicion that low-income schools are assigned less-experienced and less-qualified teachers.

Figure 2

Scatter Diagram Relating Teaching Experience to Pupil Racial-Ethnic Distribution (1969/70; N=35)

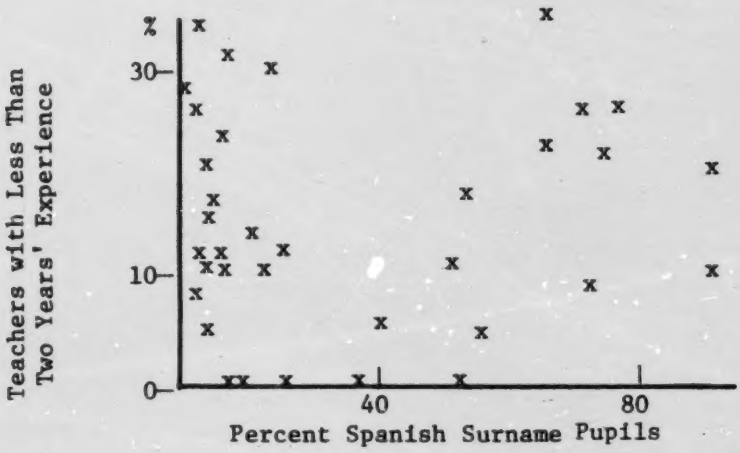
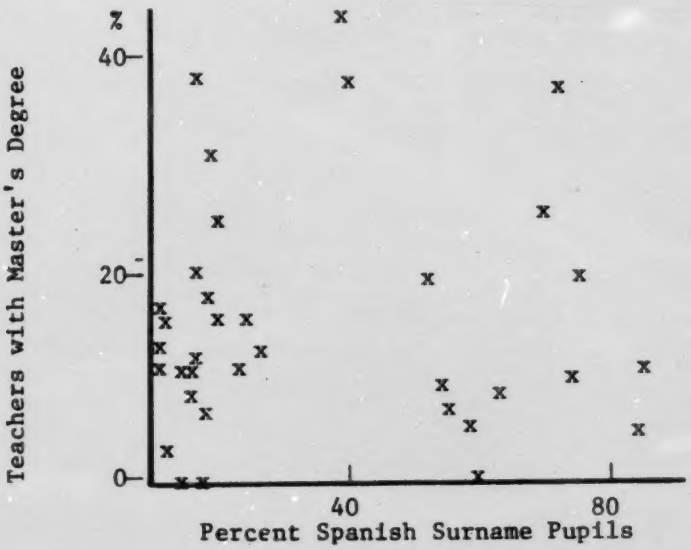


Figure 3

Scatter Diagram Relating Teacher's Academic Degree to Pupil Racial-Ethnic Distribution (1969/70; N=35)



Trends in School Characteristics

School characteristics change over time. If we inspect the characteristics of the schools in the sample over the period from 1968/69 to 1971/72, we can observe three major trends: the percentage of minority teachers increased; both the percentage of free lunches provided and the percentage of Spanish surname pupils receiving the free lunches increased; and minority teachers were increasingly assigned to schools that had many Spanish surname pupils.

There were small but systematic changes in school enrollments and in the racial-ethnic distribution of pupils and teachers (Table 7). School enrollment diminished after a continual increase to 1970/71, reflecting a change in birthrate rather than a change in type of population (Harnischfeger, 1973b). The variation in the average number of pupils per school was so small, however, that it is unlikely to have resulted in institutional changes having substantial impact on teacher mobility. The percentage of Spanish surname pupils increased over the time period, but with little likelihood of causing structural change in the mobility process.

Table 7. Means of School Characteristics

School Characteristics	School Year			
	1968/69	1969/70	1970/71	1971/72
School Enrollment*	602.00	608.10	613.10	608.40
Percent Pupils Receiving Free Lunch**	-	5.14	22.04	33.86
Percent Pupils with Spanish Surname	29.53	30.06	30.77	30.55
Percent Nonminority Teachers*	90.55	90.52	87.96	87.96

*These means are based on 33 schools for which there were complete and reliable data for all years.

**These means were based on 21 schools because for some years complete data were not available by school for all schools. No comparable data were available for the 1968/69 school year.

Decisive changes occurred in the racial-ethnic composition of the district's teachers. The total percentage of Spanish surname teachers in the district almost quadrupled--from 1.5 percent to 5.3 percent--over the four years (Harnischfeger, 1973b). The distribution of minority teachers did not change uniformly through the district, but a systematic difference in the percentage of nonminority teachers--by school--is observable between 1969/70 and 1970/71 (Table 7). These trends reflect modifications in the district's minority hiring policy. Such changes could alter the mobility process.

An extraordinarily large increase occurred in the extensiveness of the free lunch program (Table 7). The percentage of lunches provided by the program increased nearly sevenfold from 1969/70 (5 percent) to 1971/72 (34 percent). Such an expansion might not modify the structure of the teacher mobility process, but careful consideration should be given to possible changes in the socioeconomic status interpretation of the variable, if the extension was accompanied by changes in the kinds of pupils subsidized. An investigation of the interrelations among the school characteristics for 1969/70 and 1970/71 confirms the suspicion that it was accompanied by such changes (Tables 8 and 9). The correlation between free lunch and percent Spanish surname pupils increased from .35 to .92, reflecting not only the massive increase in the free lunch program, but also a much closer alignment of the characteristics.

Table 8. Means, Standard Deviations, and Intercorrelations of School Characteristics for the 1969/70 School Year (N=31)

	Mean	Standard Deviation	Intercorrelations (1)	(2)	(3)	(4)
(1) School Enrollment (natural logarithm)	6.27	.438	1.000			
(2) Percent Pupils Receiving Free Lunch	5.13	5.09	.180	1.000		
(3) Percent Pupils with Spanish Surname	31.83	28.76	-.070	.345	1.000	
(4) Percent Nonminority Teachers	90.45	8.30	-.072	-.262	-.581	1.000

Table 9. Means, Standard Deviations, and Intercorrelations of School Characteristics for the 1970/71 School Year (N=33)

	Mean	Standard Deviation	Intercorrelations (1)	(2)	(3)	(4)
(1) School Enrollment (natural logarithm)	6.31	.483	1.000			
(2) Percent Pupils Receiving Free Lunch	22.04	18.45	-.249	1.000		
(3) Percent Pupils with Spanish Surname	30.77	28.10	-.296	.916	1.000	
(4) Percent Nonminority Teachers	87.96	10.39	.046	-.726	-.789	1.000

Further, there was a large and systematic relation between a school's percent Spanish surname pupils in 1969/70 and percent free lunch in 1970/71 for schools which had also had extensive free lunch programs in 1969/70. This relation indicates a substantial realignment of the free lunch program to Spanish surname pupils in 1970/71. As there was no detectable relation for percent free lunch between the two years for schools with similar proportions of Spanish surname pupils, there were few carry-over effects of the old policy.[2]

[2]These statements reflect the results of multiple regression analyses relating each of the two indices (Spanish surname and free lunches) in 1970/71 to the values of both variables in 1969/70. Table F.1 displays the means, standard deviations, and intercorrelations for both variables for both years.

Table F.1. Means, Standard Deviations, and Intercorrelations of Socioeconomic Variables for the 1969/70 and 1970/71 School Years (N=31)

Variable	Mean	Standard Deviation	Intercorrelations $(2)_{69}$	$(3)_{69}$	$(2)_{70}$	$(3)_{70}$
$(2)_{69}$ Percent Pupils Receiving Free Lunch (1969/70)	5.13	5.08	1.000			
$(3)_{69}$ Percent Pupils with Spanish Surname (1969/70)	31.76	28.64	.345	1.000		
$(2)_{70}$ Percent Pupils Receiving Free Lunch (1970/71)	23.37	18.24	.223	.919	1.000	
$(3)_{70}$ Percent Pupils with Spanish Surname (1970/71)	32.45	28.05	.306	.991	.910	1.000

These findings foreshadow two important considerations for subsequent analyses. One of these is the expected low quality of the free lunch variable as an index of socio-economic status in 1969/70. The other is that the very high correlation between free lunch and Spanish surname in 1970/71 will make it difficult to distinguish or even detect the separate effects of these variables on teacher mobility.[3]

Changes in teacher assignment over the four years are apparent (see Tables 8 and 9). The strengthened relation between percentage of non-minority teachers and percentage of Spanish surname pupils (-.58 to -.78)

The regression models estimate were (ignoring constant terms):

$$(1)\quad x_2 = \lambda_x x_1 + \lambda_y y_1 + \varepsilon ,$$

$$(2)\quad y_2 = \gamma_x x_1 + \gamma_y y_1 + \delta ,$$

where x and y represent the percentage of pupils with Spanish surnames and the percentage of pupils receiving free lunch, respectively. The subscripts 1 and 2 correspond to 1969/70 and 1970/71, respectively. λ_x and λ_y represent the impacts of Spanish surname and free lunch, during 1969/70, on Spanish surname in 1970/71; γ_x and γ_y represent these influences on free lunch in 1970/71. The estimates obtained are as follows:

Spanish Surname: $\hat{\lambda}_x = 0.985$ (Spanish Surname)

$\hat{\lambda}_y = -0.226$ (Free Lunch)

Free Lunch: $\hat{\gamma}_x = 0.609$ (Spanish Surname)

$\hat{\gamma}_y = -0.384$ (Free Lunch)

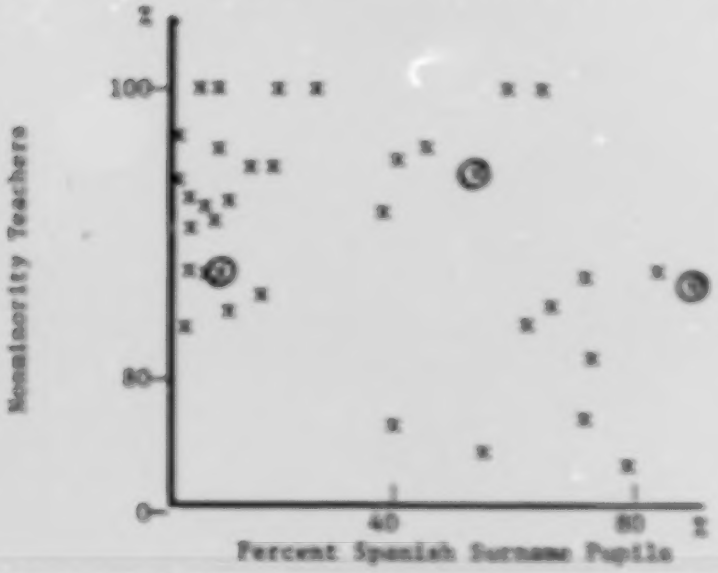
Neither of the coefficients reflecting the influence of free lunch is statistically significant at the .05 level. Their standard errors are .734 and 1.455 in the Spanish surname and free lunch regressions, respectively. Both coefficients, reflecting the influences of Spanish surname, reach significance. Their standard errors are .130 and .258, respectively.

[3]This decrease in precision, accompanying high intercorrelations of explanatory variables in regression analyses, is a result of what is called the problem of multi-collinearity. When these interrelations increase, the standard errors of the estimates of the coefficients from the regression analysis also increase. When these relations are relatively close, the resulting precision is sometimes low enough to mask very large effects.

shows that minority teachers were increasingly assigned to schools with high percentages of Spanish surname pupils. The relation in 1970/71 is quite strong, demonstrating that at least one factor in teaching staff composition was influenced by school characteristics (Figure 4). There were no schools with less than 35 percent Spanish surname pupils in which the minority teaching staff constituted more than 15 percent of the total teaching staff; approximately a third of the schools with large proportions of Spanish surname pupils had more minority teachers.

Figure 4

Scatter Diagram Relating Racial-Ethnic Distribution of Pupils and Teachers (1970/71, N=36)



The encircled points represent schools which were omitted from the 1970/71 regression analyses and correlations.

The relation between free lunch and the percentage of nonminority teachers increased (from -.26 to -.73), confirming the inferences regarding realignment of the free lunch program as well as that concerning teacher assignment to schools. Other, smaller, changes concerning school enrollment were not systematic enough to encourage interpretation.

Differences Among Schools: A Summary

The schools in this study ranged in size from just over 500 to 1200 pupils with only four very large schools. Although the one sizable minority group (Spanish surname pupils) in these schools constituted 30 percent of the elementary student population, the schools varied widely in their percentages of these pupils. In 36 percent of the schools more than half of the student population was of Spanish heritage, whereas in 44 percent, this minority group was highly underrepresented.

In assessing school socioeconomic level, both the racial-ethnic distribution of a school's student body and the percent of low-income pupils who received free lunches were considered. Whereas in 1969/70, these two indices of socioeconomic status were only slightly related, the realignment of the free lunch program in 1970/71 resulted in strong correspondence between Spanish surname pupils and subsidized lunches. This fact implies that differentiation of schools with respect to the socioeconomic status of their student bodies can best be consistently attained, in these data, on the basis of the racial-ethnic distributions.

The common complaint that low-income schools, in this case schools with a majority of Spanish surname pupils, are assigned many more inexperienced and less-qualified teachers was tested. Although some differences in resource allocation were found, it was not possible to confirm the hypothesis that low-income schools especially suffered from less-experienced and less-qualified teachers.

Only 10 percent of the district's elementary teachers came from minority groups. In 1969/70, 17 percent of the schools were without minority teachers, and the school with the largest minority teaching staff still had over 70 percent nonminority teachers. Spanish surname teachers formed only a part of the minority teacher group. Their number, however, quadrupled to 5.3 percent of all teachers between 1969/70 and 1971/72. This percentage still fell far short of the percentage of Spanish surname pupils. It is obvious that Spanish surname teachers were being concentrated in schools with a majority of Spanish surname pupils, which also means that Spanish surname teachers were more often

assigned to low-income schools. The next section probes the mobility relevance of the assignment of Spanish surname teachers and asks whether the school differences generally have implications for teacher mobility.

3. Forecasting Mobility from Teaching Staff Characteristics

In an earlier analysis of the effects of personal teacher characteristics on teacher mobility (Hanushek, 1973c), six sets of such characteristics were defined and were incorporated into a model of the mobility process: the age and sex of the teacher, years of teaching experience, length of service in the district, level of professional education, and academic degree held. These variables were related to four kinds of mobility events: leave of absence, transfer between schools, termination of employment in the district, and stability, i.e., staying at the same school.

The determination of the separate effects of single teacher characteristics was complicated by the fact that the characteristics are highly interrelated. Unless these interrelations are taken into account, they are apt to lead to confounded or spurious estimates of the potency of individual teacher characteristics. The effects of teacher characteristics without the confounding influences of related variables are described in Hanushek (1973c). Estimates were adjusted on the basis of an analytical model for the mobility process.

The procedures used in conjunction with the analytic model allow a simulation of the mobility process that makes it possible to predict a teacher's mobility on the basis of personal characteristics.[4] This estimated probability expresses the likelihood that a teacher, within a specified time period, will take a leave of absence, transfer to another school,

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[4]The analytic model consisted of three separate regression specifications, one each for leave of absence, transfer, and separation. These mobility events and the explanatory teacher characteristics were quantified as multiple dichotomies. The process of adjusting the effects of specific teacher characteristics for confounding influences involved estimating the coefficients in the three regression specifications (Hanushek, 1973c, pp. 13-15 n. 4). The coefficients, together with a teacher's characteristics, may be used to forecast the likelihood of his or her mobility. Such a "simulation" of the mobility process may be considered a summary index of the teacher's mobility propensity based on his or her characteristics.

terminate employment, or stay in the same job. These predictions can be made for each teacher in each school in the district. Thus we can obtain a set of individually predicted mobility propensities for every school. The school average of these is an index of the likelihood that a typical teacher in a particular school will leave in a specified time period. These indices may be interpreted as the expected proportion of teachers taking leaves of absence, transferring, terminating employment, or staying in a school, i.e., as the expected mobility propensities of a school. The propensity values reflect differences in the compositions of the schools' teaching staffs. They reflect, however, only those differences among teachers which are relevant to, that is, affect, teacher mobility.

The mobility propensities were, of course, determined on the basis of actual mobility rates, i.e., the proportion of teachers in a specified period who did take leaves of absence, who did transfer to another school, who did terminate employment, and who did stay at a specific school. These latter rates constitute the explicans of this investigation.

Teacher mobility varied considerably among schools (see Tables 10 - 13). Looking at the most commonly investigated rate, teacher dropout, or separation (Table 11), we see that only three schools had no terminating teachers. Very high dropout rates (over 30 percent) occurred in six schools. If, however, we focus on the instability of the schools' teaching staffs--that is, consider all of the teachers who left a specific school for any reason within a two-year period (Table 13)--then every school lost at least an eighth of its teaching staff. Most schools (53 percent) had to replace between 20 and 40 percent of their teachers. One school nearly renewed its entire teaching staff in three successive school years (92.3 percent).

Table 10. Leave of Absence Rates by School (N=36), 1969/70 - 1971-72

0	00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 00, 37, 42, 43, 45, 48
0	53, 56, 56, 57, 74, 77, 77, 80, 83, 91, 94
1	08*
1	67
2	06
3	33*

*These schools were eliminated from the 1969/70 regression analyses.

Table 11. Separation Rates by School (N=36), 1969/70 - 1971/72

0	00, 00, 00*, 43, 48
0	56, 63, 77, 91, 91
1	00*, 11, 11*, 15, 25, 25, 43
1	54, 54, 56, 56*, 58, 60, 67, 74, 82, 82, 90
2	00
2	50
3	00*, 08, 14, 33
3	64, 70

*These schools were eliminated from the 1969/70 regression analyses.

Table 12. Transfer Rates by School (N=36), 1969/70 - 1971/72

0	00, 00, 00, 00, 00, 00, 00*, 00*, 00*, 31*, 43, 45, 48
0	63, 67, 77, 77, 77, 80, 83, 91
1	11, 11*, 25, 36, 43, 48
1	82
2	38
2	73, 78
3	13, 33
3	75, 85
.	
.	
.	
6	92

*These schools were eliminated from the 1969/70 regression analyses.

Table 13. Percentage of Teachers Leaving a Specific School (N=36), 1969/70 - 1971/72.

1	25, 25, 67, 67
2	10, 22*, 31, 31, 38, 61, 61, 67, 73, 73, 86, 86
3	18, 20, 33, 44*, 53, 64, 85, 89
4	17, 44
5	00, 00, 13*, 46, 81
6	00*, 15, 36, 67
7	
8	
9	23

*These schools were eliminated from the 1969/70 regression analyses.

The schools' large variation (standard deviation) in actual mobility rates was not paralleled in their propensity values. Schools varied in their actual teacher mobility much more than in their mobility propensities. The schools propensity values for transfer were about one-sixth less variable than the actual rates, and those for separation and leave of absence were about one-third less.

The interrelations among the propensity rates show a varying but strongly negative relation for transfer and separation (from -.58 to -.85). Those schools which tended to have many highly dropout-prone teachers did not tend to have many highly transfer-prone teachers. They did, however, tend to have a larger proportion of teachers with high leave-taking propensities (from -.12 to .23). Of course, negative relations among these different propensities for individual teachers should be expected, since it is impossible to terminate employment, transfer to another school, take a leave of absence, and stay at a specific school simultaneously.[5] We would expect the same negative relations to hold for schools if teachers

[5]The minimum average correlation among any set of four variables is -.333 (Stanley and Wiley, 1962). This is a valid expected correlation when the four variables are complementary. The empirical correlation between predicted separation and predicted transfer is of consistently greater magnitude.

were randomly allocated. However, our intercorrelations depart considerably from the expected ones. They show that teachers with similar mobility propensities were assigned together more often than by chance.

The correlations of the actual teacher mobility values show a different picture, much closer to the correlations expected from random teacher allocation to schools (Tables 14-16). The values certainly do not parallel the high negative relation between the separation and transfer propensities. It seems clear that although the teaching staffs with high proportions of separation-prone teachers had low proportions of transfer-prone teachers, schools with high actual separation rates did not generally have low transfer rates.

The mobility propensity and the actual teacher mobility for each school show a systematic, moderate, positive coherence. This is especially true for the most stable data (1969/70 - 1971/72), which is not unexpected because the analytic method used was designed to summarize optimally the teacher characteristics contributing to mobility.

The correlations between the school variables assessed (school size, racial-ethnic distribution of pupils, socioeconomic status of student body) and the propensities for teacher mobility are small (Table 17).[6] There is no evidence that these school characteristics are related to the mobility propensities of the teaching staffs. This is not to say that schools with varying characteristics do not differ considerably in their teaching staff compositions. It appears, however, that these possible differential influences cancel each other out in the determination of mobility propensities, so that, for example, the greater tendency of a staff's young teachers and teachers with Master's degrees to drop out may be compensated for by the stability in school affiliation of the staff's middle-aged (38 to 53 years) and male teachers (Harnischfeger, 1973c). Therefore, it could still be true that certain school characteristics, such as the socioeconomic level of the student body, strongly influence the assignment of certain types of teachers.

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[6]Not even one of the 27 (3 characteristics by 3 types of mobility for 3 time spans) school-characteristic mobility-propensity correlations approaches common levels of statistical significance.

Table 14. Means, Standard Deviations, and Correlations of Propensity for Mobility and Actual Teacher Mobility (N=31), 1969/70 - 1970/71

	Mean	Standard Deviation	Correlations (a)	(b)	(c)	(A)	(B)	(C)
Propensity for								
(a) Leave of Absence	4.70	1.45	1.000					
(b) Separation	7.81	2.50	.233	1.000				
(c) Transfer	8.30	1.94	-.316	-.744	1.000			
Actual								
(A) Leave of Absence	4.09	5.48	.122	-.023	-.207	1.000		
(B) Separation	6.63	6.51	-.137	.433	-.424	-.093	1.000	
(C) Transfer	7.98	10.91	.004	-.037	.220	-.127	-.054	1.000

Table 15. Means, Standard Deviations, and Correlations of Propensity for Mobility and Actual Teacher Mobility (N=33), 1970/71 - 1971/72

	Mean	Standard Deviation	Correlations (a)	(b)	(c)	(A)	(B)	(C)
Propensity for								
(a) Leave of Absence	6.06	1.98	1.000					
(b) Separation	8.39	1.66	-.124	1.000				
(c) Transfer	7.73	1.44	.064	-.579	1.000			
Actual								
(A) Leave of Absence	5.17	5.69	.494	.084	.121	1.000		
(B) Separation	8.92	7.51	-.383	.318	-.285	-.341	1.000	
(C) Transfer	9.23	11.36	-.267	.122	.276	-.072	.129	1.000

Table 16. Means, Standard Deviations, and Correlations of Propensity for Mobility and Actual Teacher Mobility (N=31), 1969/70 - 1971/72

	Mean	Standard Deviations	Correlations (a)	(b)	(c)	(A)	(B)	(C)
Propensity for								
(a) Leave of Absence	6.92	2.13	1.000					
(b) Separation	16.08	3.36	.215	1.000				
(c) Transfer	13.36	2.49	-.250	-.850	1.000			
Actual								
(A) Leave of Absence	5.31	6.77	.466	.137	-.265	1.000		
(B) Separation	15.82	9.91	-.102	.457	-.301	-.214	1.000	
(C) Transfer	14.46	15.41	-.014	-.251	-.378	-.165	-.055	1.000

Table 17. Cross-Correlations of School Characteristics with Propensity for Mobility and Actual Teacher Mobility

School Characteristics	1969/70-1970/71* Propensity	1969/70-1970/71* Actual	1970/71-1971/72** Propensity	1970/71-1971/72** Actual	1969/70-1971/72* Propensity	1969/70-1971/72* Actual
			Leave of Absence			
(1) School Enrollment (natural logarithm)	.099	.055	.170	.266	.243	.044
(2) Percent Pupils Receiving Free Lunch	-.050	-.140	-.187	-.057	.025	-.209
(3) Percent Pupils with Spanish Surname	-.194	-.291	-.257	-.094	-.182	-.077
(4) Percent Non-Minority Teachers	.151	.341	.243	-.121	.174	-.082
			Separation			
(1) School Enrollment (natural logarithm)	.270	.354	-.081	-.127	.064	.091
(2) Percent Pupils Receiving Free Lunch	-.104	.063	.231	.194	-.120	-.082
(3) Percent Pupils with Spanish Surname	.028	.019	.156	.231	-.004	-.148
(4) Percent Non-Minority Teachers	-.176	-.165	-.065	-.205	-.102	-.138
			Transfer			
(1) School Enrollment (natural logarithm)	-.124	-.130	-.036	.500	-.133	-.323
(2) Percent Pupils Receiving Free Lunch	.112	-.006	-.135	.298	.008	-.021
(3) Percent Pupils with Spanish Surname	.012	.480	-.088	.379	.005	.485
(4) Percent Non-Minority Teachers	.156	.031	-.005	-.204	.111	.067

*N = 31
**N = 33

There was one important relation evident between teaching staff and student body. Beginning in 1969/70, when the district obviously changed its hiring policy for minority teachers, the racial-ethnic composition of teaching staffs became more closely related to those of the student bodies. Furthermore, in 1970/71, when the district's free lunch program was realigned to more closely match Spanish surname pupils, the racial-ethnic student distribution and extensiveness of the free lunch program--both indicating the socioeconomic status of a school's student body--became more closely related to a school's percentage of minority teachers. The next link in the chain, however, is not yet in place: that is, the relevance of the racial-ethnic group membership of the teacher to mobility.

4. Explaining Mobility by Means of School Characteristics

The model of the mobility process (Figure 1) postulated the determination of teacher mobility by two factors: school characteristics and teaching staff composition. The predicted mobility rates (propensities) discussed in the last section summarized the mobility-relevant aspects of the schools' staff compositions. Further, the teaching staffs were characterized by their members' racial-ethnic backgrounds. Thus we have four variables representing teaching staff composition, three of which are mobility predictions: leave of absence propensity, transfer propensity, and separation propensity. The fourth is percentage of nonminority teachers.

If teacher mobility had been analyzed without incorporating these variables, part of the teacher-characteristic effects would have been attributed to the general school characteristics that are correlated with them. With these data, however, such a misattribution would have resulted in only small biases in the estimates of the influences of school characteristics on teacher mobility, because the correlations between the mobility predictions for teaching staffs and the characteristics of schools were small. Accounting for this relation eliminated, of course, even the small bias which did exist.[7] The systematic relationship of

[7] By bias is meant consistent under- or over-estimation of a variable's effect. This may be contrasted with imprecision, which means inaccurate estimation, but without consistency. Both contribute to overall inaccuracy.

predicted and actual mobility rates, however, implies that it is possible to increase the precision of our estimates of the effects of school characteristics by including mobility propensities based on teaching staff characteristics in our assessments.[8]

To assess the effects of school characteristics on teacher mobility, an analytic version of our conceptual model, specifying relations between actual mobility rates and concrete school characteristic and staff composition variables, is required. Section 2 described three operational school variables: school size, racial-ethnic distribution of pupils, and extensiveness of free lunch programs.

Since there are three basic mobility rates: leave of absence, separation, and transfer, three distinct models must be specified.[9] We have chosen to specify each model as an additive linear regression model, which includes school size, percent Spanish surname pupils, and percent free lunch as explanatory school characteristics for each kind of mobility. The percentage of minority teachers and the relevant propensity measure are also included to account for differences among teaching staffs.[10]

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[8]The increase in precision results because the inclusion of additional explanatory variables in a regression analysis, when they influence the variable to be explained, reduces the magnitude of the standard errors of the estimated coefficients. This reduction occurs because these standard errors are proportional to the square root of the unexplained variance, which diminishes as more influences are included.

[9]The rate at which teachers stay at a school is complementary to mobility. Consequently, the determinants of leave of absence, transfer, and separation are also determinants of staying. This implies that the results of the regression analyses for the three separate mobility rates can be summarized to explain the stay rate. The details of this process are discussed in Footnote 11.

[10]The models may be specified by:

$$y_i = \alpha + \beta_1 x + \beta_2 y_i' + \gamma_1 z_1 + \gamma_2 z_2 + \gamma_3 z_3 + \varepsilon_i \quad ,$$

where y_i and y_i' represent the mobility rate (e.g., transfer) and its propensity, respectively; x represents percentage of nonminority teachers; and the z's represent the three school characteristics. The Greek letters are coefficients representing the influences of the variables on mobility. The estimates of these coefficients will form the bases for our interpretations.

The three time spans available in our data (1969/70 - 1970/71, 1970/71 - 1971/72, and 1969/70 - 1971/72), together with the three aspects of mobility, imply nine distinct regression analyses, the results of which are reported in Table 18. Analyses of the complement of these mobility rates--the rate at which teachers stay in a particular school--are reported also.[11]

Summarizing the results by aspect of teacher mobility, we find no evidence for the common belief that teachers assigned to low-income schools have higher dropout rates. None of the school characteristics had any detectable effect on teacher separation. Dropout rates may have been falsely attributed in other studies to school instead of teacher characteristics, because of differential assignments of different types of teachers to different kinds of schools. From the analysis of teacher characteristics (Hernischfeger, 1973c), it is clear that separation is strongly influenced by a teacher's age, years of teaching, and academic degree. But the results reported here signify no such relation for a

[11] Stay rates are equal to one hundred minus the percentage rates for leave of absence, transfer, and separation. Since each of the three basic regressions includes the predicted value (propensity) for that mobility rate, the corresponding regression for stay would have included it also. Stay is the complement of mobility. Consequently, its regression coefficients could have been directly calculated from those of transfer, leave of absence, and separation, if the explanatory variables in these three regressions had been identical. In this case, the coefficients for stay would have been the negative of the sum of the three coefficients from the other regressions.

Unfortunately, these explanatory variables differ among the three regressions: the propensity measures for transfer, leave of absence, and separation are different variables. We may proceed, however, if we assume that the propensity measure for a specific mobility summarizes all of the influences on that rate of the teacher characteristics which make it up. Then, we can approximate the appropriate coefficients using the above calculation. This we did.

The standard errors of those coefficients can also be approximated. We can compute what they would have been if each of the mobility propensities had been separately included in the regression, in place of the stay propensity. This was done. The standard error values, for stay, in the table are always the largest of the three computed.

Table 18. Results of School-Level Regression Analyses

Independent Variable		Leave of Absence 1969/70	Leave of Absence 1970/71	Leave of Absence 1969/71	Separation 1969/70	Separation 1970/71	Separation 1969/71	Transfer 1969/70	Transfer 1970/71	Transfer 1969/71	Stay[a] 1969/70	Stay[a] 1970/71	Stay[a] 1969/71
(1) Pupil Enrollment	Coeff.	.009	.012	-.009	.035	-.012	.022	.002	-.042089	-.040060	-.046	.089	.048
(natural logarithm)	Std. Error	.024	.020	.027	.028	.030	.041	.039	.038039	.048048	.060	.059	.076
(2) Percent Pupils	Coeff.	-.047	-.000	-.352	.062	-.115	-.223	-.009	-.063093	-.442643	.397	.209	1.018
Receiving Free Lunch	Std. Error	.219	.118	.239	.246	.185	.374	.360	.232232	.433431	.540	.356	.698
(3) Percent Pupils with	Coeff.	-.021	-.069	-.013	-.011	.081	.065	.297	.212212	.412613	-.265	-.223	-.465
Spanish Surname	Std. Error	.046	.091	.050	.050	.139	.077	.074	.172177	.098090	.113	.268	.144
(4) Percent Non-Minority	Coeff.	.174	-.286	-.229	-.079	-.107	-.008	.539	.112029	.798799	-.636	.263	-.562
Teachers	Std. Error	.153	.144	.168	.171	.220	.259	.252	.252083	.302302	.377	.424	.484
Aggregated Teacher Characteristics	Coeff.	.197	1.481	1.673	.929	1.451	1.189	.952	1.222029	1.892891			
(Control Variable)	Std. Error	.720	.460	.552	.482	.836	.684	.885	1.212210	.822821			
Intercept	Coeff.	-.171	.160	.225	-.156	.135	-.172	-.375	.112319	-.961561	1.902	.386	1.508
Standard Error of Estimate		.056	.049	.061	.061	.075	.094	.091	.098096	.112110			
Multiple Correlation		.371	.614	.570	.508	.396	.496	.832	.612832	.760760			
F-ratio		.799	3.264	2.405	1.739	1.001	1.634	3.709	1.223073	6.812816			
SD of Dependent Variable		.055	.057	.068	.065	.075	.099	.109	.116134	.156154	.133	.145	.185
Mean of Dependent Variable		.041	.052	.053	.066	.089	.158	.080	.092092	.145145	.813	.787	.644

[a]See Footnote 11 in the text

teacher's racial-ethnic group membership. They do not validate the prevalent opinion that teachers assigned to low-income schools give up teaching at a higher rate than teachers assigned to other schools. Similar results are found for teachers' leave-taking behavior. No school characteristic influenced leave of absence. Whether a teacher took a leave of absence or not was solely determined by personal characteristics. In general, the strength of these relations can easily be influenced by district policy.

At the end of school year 1969/70, four percent of the elementary teachers went on leave of absence. Many were female teachers under the age of 30 (Harnischfeger, 1973c). In that year there were no differences between minority and nonminority teachers in taking leaves of absence. At the end of the following school year (1970/71), five percent of the total teaching population went on leave of absence, an increase of 25 percent. Again, they were mainly young, female teachers, but surprisingly, minority teachers took leaves at a higher rate than before. They also took relatively more leaves than nonminority teachers, whose leave rate stayed about the same. This may indicate that the district changed its leave policy in favor of minority teachers.

Leave of absence rates were, generally, about half those for transfer. About eight percent of the total teaching population transferred to another school between the first two school years. This overall rate increased slightly (to nine percent) between 1970/71 and 1971/72.

It was found earlier that a teacher's age, seniority in the district, and professional education are major determinants of teacher transfer; teachers with the highest transfer rates are those between 30 and 53 with high levels of professional training (Harnischfeger, 1973c). From the current analysis, another teacher-characteristic effect is apparent. Nonminority teachers had a considerably higher transfer rate than minority teachers between 1969/70 and 1970/71. But while the nonminority transferred at about the same rate in the subsequent period, there was a large increase in transfer for minority teachers. As with leave of absence, the increase might indicate that district policies changed, favoring minority teachers.

Transfer was the only kind of mobility that was strongly influenced by teaching environments as well as the characteristics of teachers themselves. The more recent transfers (1970/71 - 1971/72) were influenced by school size. Large schools seemed to have lower transfer rates than small schools. This effect is consistent with the hypothesis that teachers have an easier time finding a satisfactory work setting in a larger school. This advantage could even have been increased by decreasing elementary school enrollment, which may affect smaller, less flexible schools more than large ones.

For any two schools with similar teaching staffs, the difference in the percentage of teachers transferring was largely dependent on the schools' percentage of Spanish surname pupils. Since this characteristic strongly reflects the socioeconomic status of a school's student body, we can infer that low-income schools suffer from large transfer rates. This relation is consistently obvious over the whole period, although it is not precisely determined in 1971/72 because of the high correlation between the Spanish surname and free lunch variables. The precision decreased so greatly that the effects of these variables are not really differentiable.[12] In the earlier time period, the free lunch variable was only weakly related to Spanish surname, and thus allowed more precise estimation of the influences of socioeconomic status of a student body on the transfer behavior of teachers.

Analyzing transfers from 1968/70 to 1971/72, we find that the percentage of Spanish surname pupils had by far the largest variable effect encountered in the study. The difference in transfer rates between otherwise similar schools and teaching staffs can be more than 30 percent owing to differences in pupil ethnic composition. For example, a school with five percent Spanish surname pupils, but with a typical teaching staff, has only a three percent transfer rate, while an otherwise similar school, with 75 percent such pupils, has a 32 percent rate.[13]

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[12] The standard errors of the coefficients increased by a factor of 2.5. See Footnote 3.

[13] When all variables but percentage of Spanish surname pupils are held constant, the relation between transfer rate and this variable is

One of the most explicit mobility hypotheses in the literature specifies that teachers in low-income schools seek to and do transfer to schools whose pupils are of higher socioeconomic status (Hanushek/Kain, 1972a), but there has been no convincing evidence on this point. Prior studies never clearly accounted for the contaminating effects of teaching staff composition. In our case, this effect is extremely important because: (1) the percentage of Spanish surname pupils influenced the allocation of teachers from different racial-ethnic groups, and (2) the racial-ethnic group of a teacher influenced the teacher's mobility. These two links result in a strong chain connecting percent Spanish surname pupils (i.e., low-income pupils) and teacher transfer *only* via differences in staff composition.

At this point, it is not possible to answer fully the question What kinds of teachers in a low-income school are especially transfer-prone?, because the model does not allow interaction between teacher and school characteristics. However, we do know that in general nonminority teachers have higher transfer rates. We also know that minority teachers' transfer increased in the district, and that these teachers were predominantly assigned to low-income schools. Since minority teachers were less transfer-prone in 1969/70, their concentration in low-income schools resulted in lower actual transfer rates for low-income schools compared to

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a simple linear one: $y = \mu + \beta s + \varepsilon$, where y represents transfer rate, s percent Spanish surname, β the regression coefficient, ε the error, and μ the constant term together with the constant influence of the other variables. This implies that $\bar{Y} = \mu + \beta \bar{S}$; i.e., the mean transfer rate is a constant plus the product of the regression coefficient and the mean percent Spanish surname. The transfer (1969/70 - 1971/72) regression coefficient for percent Spanish surname pupils is 0.4135. Since the mean percent Spanish surname pupils in 1969/70 is 31.83, the mean transfer rate for 1969/70 to 1971/72, which is 14.46, is equal to the constant plus .4135 times 31.83. Therefore, the constant equals 14.46 minus .4135 times 31.83 or 1.29.

From the above model, an expected transfer rate for a school with a specified percent of Spanish surname pupils, s', is $\mu + \beta s'$. Consequently, the expected transfer rates for our two hypothetical schools (5% and 75% Spanish surname pupils) are 1.29 plus .4135 times 5 and 1.29 plus .4135 times 75, or 3.36 and 32.30, respectively.

the rates these schools would have had with more typical teaching staffs. But once a change in district policy increased transfer chances for minority teachers, they too left low-income schools to a greater extent. On the one hand, the district improved the situation for minority teachers, but on the other, the low-income schools continued to carry the burden of high turnover of their staffs.

These direct and indirect impacts of the socioeconomic level of a school's student body on transfer are summarized in Figure 5. This figure has the basic structure of Figure 1: the effects of school characteristics on mobility are mediated through the effects of teaching staff composition as well as being direct. It is, however, more differentiated, transforming the conceptual relations discussed earlier into operational ones, including only variables with important effects. This diagram indicates that the proportion of pupils with Spanish surnames had an allocation effect on the racial-ethnic distribution of teachers (-.18) and almost no impact on the ele-characteristic individual transfer propensity measure.[16] The summary transfer prediction, based on seven teacher characteristics, is defined as the "optimal" combination of the ele-characteristic transfer propensity (1.88) based on teacher characteristics (Gronlund-Anger, 1973a) and percent of nonminority teachers (.88). It represents the predicted transfer rate that would have been obtained if the teachers' racial-ethnic distribution had been included in the earlier analysis. Finally, the large positive direct impact of percentage of Spanish surname pupils on transfer (.41) is indicated.

Figure 5 summarizes all of the detected effects, both direct and indirect, of a student body's socioeconomic level on teacher transfer. The indirect effect can be characterized as the product of their staff-

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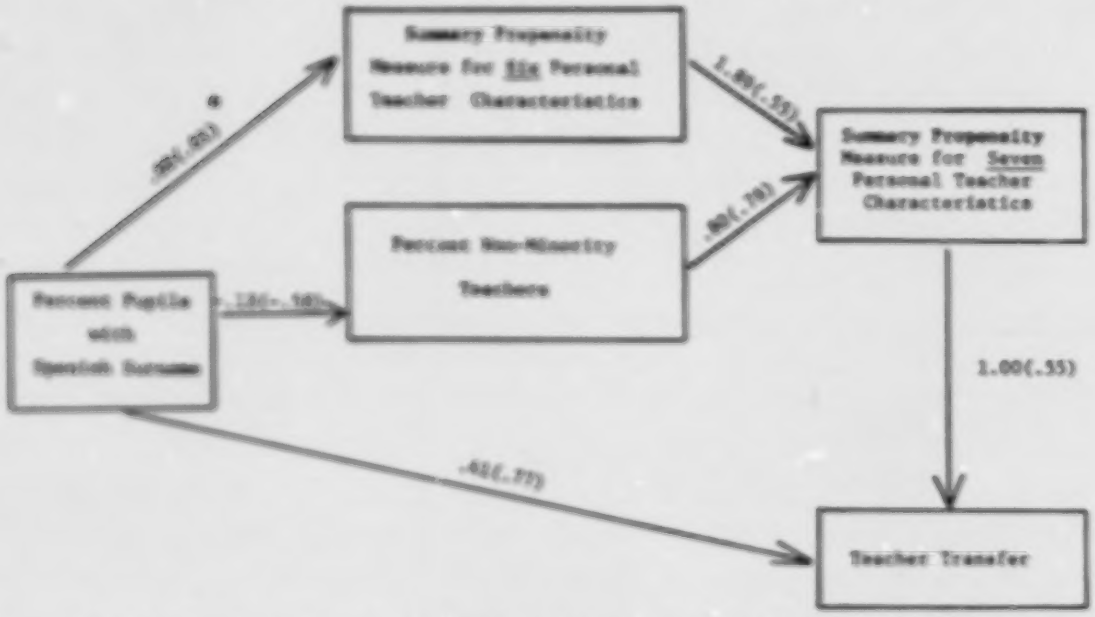
[16]The coefficients referred to in the text and displayed in Figure 5 are standardized regression coefficients. All of them are statistically significant ($p < .02$) except for that relating Spanish surname and the ele-characteristic propensity, which is essentially zero. These coefficients were obtained directly from Table 18, when possible, and by hand computation from Tables 8, 14, and 17, when the coefficients for lagging transfer rate were required. The coefficients in parentheses are standardized and were computed from the unstandardized ones using the relevant ratios of standard deviations.

Figure 5

Path Diagram Relating Specific School and Teacher Characteristics to Teacher Transfer (1969/70 - 1971/72)


Summary Propensity Measure for Six Personal Teacher Characteristics
Summary Propensity Measure for Seven Personal Teacher Characteristics
Percent Non-Minority Teachers
Percent Pupils with Spanish Surnames
1.00(.55)
1.00(.35)
Teacher Transfer

*Path regression coefficients linking measures with path coefficients are in parentheses.

allocation effect (-.18) and the effect of staff composition (.80) on transfer. This product (-.14) is negative, implying that direct (.41) plus indirect (-.14), or total effect (.27), is diminished by the allocation process. The socioeconomic effects would have been substantially underestimated if we had not taken into account these indirect effects via allocation of minority teachers.

Since "stay" is complementary to the sum of the rates for leave of absence, transfer, and separation, it indicates the stability or continuity of the teaching staff. Of males and middle-aged (38 to 53 years) teachers who form the most stable part of a teaching staff, 65 percent stay at a particular school for at least three consecutive years (Hornischfeger, 1973a, p. 4). A teaching staff's instability is mainly caused by (1) teacher dropout and retirement, which are solely determined by teachers' personal characteristics, and (2) teacher transfer,

which is influenced by both personal and school characteristics. According to the results reported above, it appears that within three years, on the average, about 16 percent of a school's teaching staff have left district employment, about 14 percent have transferred to another school, and about five percent are on leave. So, after three years, on the average, only 65 percent of a teaching staff remains.

However, the averages, combining low-income and middle-class schools, are misleading. Within three years a low-income school (75 percent Spanish surname pupils) with a typical teaching staff loses more than half of its teachers, mainly because teachers transfer away (32 percent) to middle-class schools. Every year a low-income school with a typical teaching staff has to replace one-third of its teachers, compared to about 10 percent for a middle-class school (5 percent Spanish surname pupils). This discrepancy of 23 percent (33 percent minus 10 percent) in teacher mobility is reduced to 15 percent when the actual mobility rates for low-income and middle-class schools are calculated. Considering the concrete compositions of these schools' teaching staffs, we find less extreme differences in teaching-staff continuity between such schools because of the compensating effect of the more stable school affiliations of the minority teachers, who are mainly assigned to low-income schools.

5. Conclusions

The results of this study cannot be fully understood without repeating those of our earlier study (Harnischfeger, 1973c), because the mobility propensity indices captured the influence of six personal teacher characteristics on leave of absence, transfer between schools, termination of employment in the district, and staying at the same school. The following results were found:

1. A teacher's age was found to be strongly and systematically related to every type of teacher mobility. Teachers leave district employment both because they are too young to have settled down and because they retire. Young teachers take many more leaves of absence than older ones. Transfer is most prevalent during middle age. A teacher's sex strongly influences leave-taking behavior because of maternity, but it has only weak effects on other aspects of teacher mobility.

2. Teaching experience had very little impact on any kind of mobility independent of age and length of service. Length of service, on the other hand, exerts powerful seniority effects on both leave of absence and transfer. Newly hired teachers are seldom allowed leaves of absence, and long-term district employees have very stable school affiliations.

3. Schools prefer more highly qualified teachers, a situation that facilitates the transfer of teachers with high levels of professional education. However, the degree held has only weak effects on teacher mobility. The ethnic or racial group to which a teacher belongs is of great relevance to mobility, but this characteristic was only available school by school.

This report examined the influence of school characteristics on teacher mobility: school size, racial-ethnic background of pupils, and socioeconomic level of a school's student population. The assessment of the socioeconomic levels of schools was only indirectly possible through information on the extensiveness of the schools' free lunch programs and through the percentage of Spanish surname pupils, who predominantly came from low-income families.

The conceptual model described above characterizes three important aspects of the teacher mobility process: 1. Different types of teachers have different mobility rates, regardless of their teaching location. 2. Different kinds of teachers are placed in different teaching environments, and therefore schools differ in their teacher mobility rates independently of the attractiveness of their environments. 3. Schools do differ in the attractiveness of their teaching environments, and the differences directly account for variation in teacher mobility. This model made it possible to assess the extent to which school-by-school variations in teacher mobility were due to the mobility propensity of different types of teachers, and the extent to which they were due to differences in the attractiveness of the teaching environments. It formed the basis of our attempt to unravel the skein of complex causes of teacher mobility.

Of the 10 percent minority teachers, those with Spanish surnames grew between 1969/70 and 1971/72 from a tiny proportion to 5.3 percent of all teachers. Although these teachers were concentrated in schools with a majority of Spanish surname pupils (i.e., low-income schools), it was not possible to confirm the common complaint that low-income schools are assigned many more inexperienced and less-qualified teachers.

The model in Figure 1 postulated the determination of teacher mobility by two factors: school characteristics and teaching staff composition. Predicted mobility rates (propensities) summarized the mobility-relevant aspects of staff composition. Further, the staffs were characterized by their teachers' racial-ethnic group memberships. This resulted in four variables representing teaching-staff composition: three mobility predictions (leave of absence, separation, and transfer) and percent non-minority teachers.

If the mobility process had been analyzed without incorporating aspects of teaching-staff composition, teacher-characteristic effects might have been attributed to the general school characteristics that are correlated with them. Instead, an analytic version of the conceptual model was formed by specifying the relation between actual mobility rates and concrete school-characteristic and staff-composition variables.

To summarize the results by aspect of teacher mobility, no evidence was found for the common belief that teachers assigned to low-income schools have higher dropout rates. None of the school characteristics had any detectable effect on teacher separation. This may indicate that dropout rates have been falsely attributed, in other studies, to schools instead of teacher characteristics, because different types of teachers are assigned to different kinds of schools. From the analysis of teacher characteristics, we know that separation is strongly influenced by a teacher's age, years of teaching, and academic degree. The results reported here signify no equally important relationship between separation and a teacher's racial-ethnic group membership. The opinion that teachers assigned to low-income schools give up teaching at a higher rate than teachers assigned to other schools was not validated.

Similar results were found for teachers' leave-taking behavior. No school characteristic influenced leave of absence. Whether a teacher took a leave of absence or not was solely determined by personal characteristics.

For transfer, the results were much stronger, more complex, and unexpected. The percentage of Spanish surname pupils in a school greatly affected the percentage of minority teachers assigned to the school; thus, low-income schools tended to have more minority teachers than other schools. Also, there was a close relation between teachers' racial-ethnic group and transfer. Minority teachers were less transfer-prone than nonminority teachers. These two results, together, imply that the transfer rates of low-income schools are diminished because of their staff compositions.

It was also found that the percentage of Spanish surname pupils had a large and positive direct impact on transfer, i.e., more teachers transferred out of schools with large numbers of low-income pupils. When we combine both of these influences, we obtain a smaller positive effect of the socioeconomic level of a school's student body. The transfer rates for low-income schools were still higher than those for middle-class schools, but the effects of the unattractive qualities of such school atmospheres were tempered by the presence of the less-transfer-prone minority teachers. Ordinarily, the changes in district policy that resulted both in the hiring of more Spanish surname teachers and in their primary placement in low-income schools would have further moderated the high transfer rates of those schools. But a simultaneous change in district policy, facilitating the transfers of these teachers, reduced the compensating effect. Consequently, the overall impact of these district policy changes was to increase the transfer rates for low-income schools.

6. Implications

These findings are directly relevant to the formulation of school district policies concerning hiring, initial teacher assignment, reassignment, and regulations governing leave of absence and transfer. All of the components discussed above control the process of allocation and reallocation of teachers to schools. A district can influence the mobility of its teachers most directly by means of teacher assignment, as teaching

staff composition has a major effect on mobility. By carefully attending to the distributions of age, length of service, and level of professional education in a school's teaching staff, a district can substantially alter the mobility propensity of that staff. The racial-ethnic distribution of the staff, in conjunction with other district policies, can also influence the expected proportions of teachers leaving a school.

Transfer and leave-taking behavior can be manipulated through regulations that encourage and discourage certain types of teachers from transferring or taking leaves of absence. For example, a common policy regulating transfer is based on seniority or length of service. Usually, districts discourage frequent transfer as well as transfer of teachers who have been employed for only a short time. Also, school principals are typically allowed to select among potential transferees in replacing teachers. If this process is not further controlled by the district, it generally results in higher transfer rates for professionally more qualified teachers, who move to more attractive schools. This tendency increases the instability of teaching staffs in low-income schools.

Because of the multiple impacts of policy changes on teacher mobility, it is difficult to project the influence of new policies unless the mechanisms of mobility are understood. Changes in policy generally affect the kinds of teachers hired, the allocation of those teachers to schools, and the preference given to specific types of teachers in transfer and leave of absence. Projected policy changes must be viewed against the background of the differential attractiveness of schools with specific characteristics. Without a model and a set of findings consistent with that model, the interrelations of all of these factors would be too complex to be intuitively disentangled. A district must understand the mobility process in sufficient detail to simulate the implications of its present and future policies.

We have discussed policies that allocate teachers to specific kinds of schools and constrain them to stay there. We have not discussed methods by which school districts change the attractiveness of particular schools. If the socioeconomic composition of a school's student body influences its attractiveness to teachers, a direct method of influencing

teacher mobility would involve changing that composition by, for example, busing or modifying school boundaries. Low-income schools might also gain in attractiveness if their class sizes were lowered, if they were provided better learning materials, and if more resources were allocated to meet the specific needs of their pupils. The policy change that resulted in the allocation of more Spanish surname teachers to schools with large concentrations of Spanish surname pupils is an obvious example of increasing responsiveness to the needs of these ethnic minorities.

Equality of education is primarily a resource allocation problem. The most important educational resources allocated to pupils are teachers. If we are to understand fully the dynamics of the processes that result in equalities or inequalities of educational opportunity for different kinds of pupils, we must first look at the ways in which teachers are placed and place themselves in schools. This study was an attempt to explore these dynamics and the causal processes which underlie them. The results, or results similarly obtained, are the most appropriate basis for making educational policies that control the allocation of teaching resources to pupils.

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